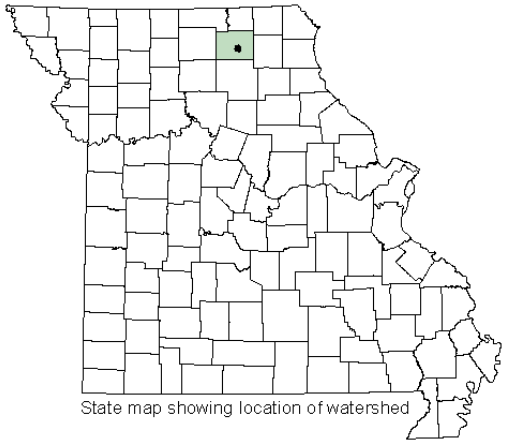
Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Bear Creek

Waterbody Segment at a Glance:

County: Adair
Nearby Cities: Kirksville, Millard
Length of impairment: 2 miles
Pollutants: Unknown
Source: Kirksville Point and Nonpoint Sources


State map showing location of watershed

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Bear Creek

- The affected portion of Bear Creek is not classified so no beneficial uses are assigned to it; however, all waterbodies in Missouri are protected by the general criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031.

Use that is impaired

- None, since no beneficial uses can be assigned.

Standards that apply

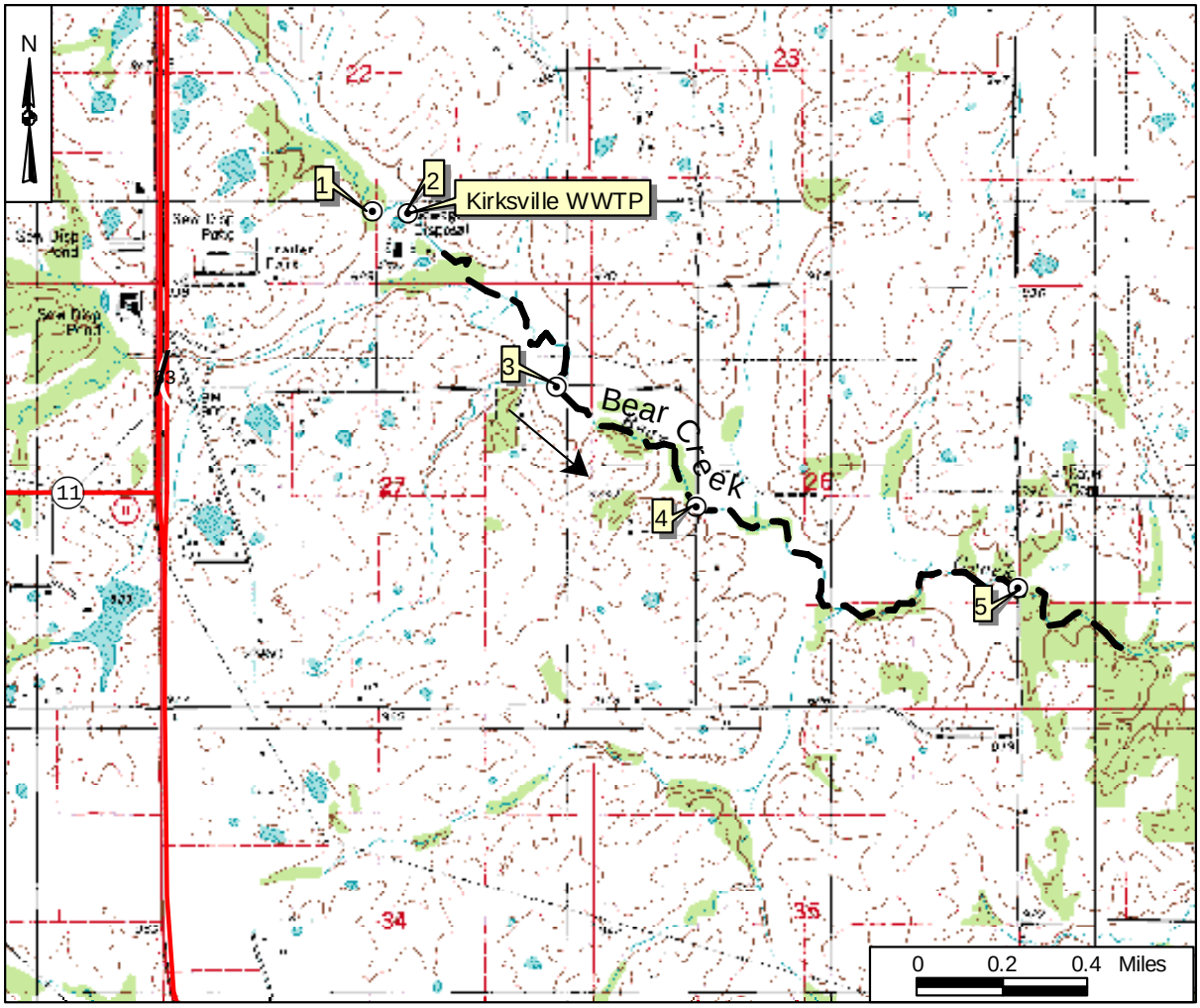
- All waterbodies in Missouri are protected by the general criteria (standards) contained in Missouri's Water Quality Standards (WQS), 10 CSR20-7.031(3). These criteria are also called narrative criteria, since they do not contain specific numerical limits. For Bear Creek, points (3)(D) and (G) apply:
  - Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life
  - Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background Information and Water Quality Data

Bear Creek in the vicinity of the Kirksville Wastewater Treatment Plant (WWTP) has an unnaturally low diversity of fish species. The Department of Natural Resources made a water quality study of Bear Creek in August 2002, which showed that the water quality downstream of the Kirksville Wastewater Treatment Plant was in good condition at the time. Since this portion of Bear Creek is unclassified, it is not required to meet state numeric water quality standards; however,

the water quality data shown in Table 1 is good enough to meet those state standards if they did apply. The problem is that fish collections made the previous year, and summarized in Table 2, show a substantial loss of fish diversity in Bear Creek near the wastewater plant.

Impaired Segment of Bear Creek in Adair County, Missouri, with Sampling Sites



Impaired Segment → Direction of Flow

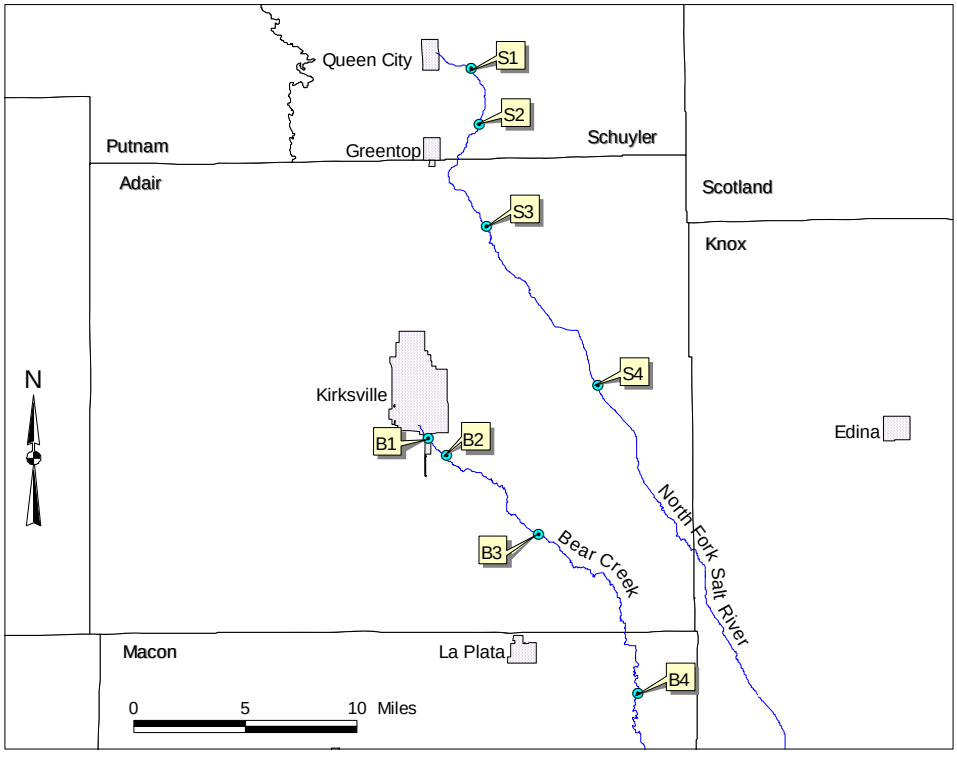
Sampling Site Descriptions

1 – Bear Creek 0.1 mile upstream of Kirksville WWTP
2 – Kirksville WWTP outfall
3 – Bear Creek 0.7 mile downstream of Kirksville WWTP
4 – Bear Creek 1.1 mile downstream of Kirksville WWTP
5 – Bear Creek 2.1 miles downstream of Kirksville WWTP

Table 1. Summary of Water Quality Studies on Bear Creek by the Department of Natural Resources, August 2002					
Site #	Flow (cfs)	Water Temp (^{o}C)	pH	Ammonia as N (mg/L)	Early Morning Dissolved Oxygen (mg/L)
1	0.1	20	7.8	<0.05	3.2
2	3.40	23	7.6	0.18	6.2
3	3.5	20	7.3	0.41	3.9
4	3.5	20	7.4	0.45	4.4
5	3.5	20	7.6	0.27	3.2

The Department of Conservation did a fish survey of Bear Creek and North Fork Salt River in May 2001. This study found few fish in Bear Creek in the vicinity of the Kirksville WWTP compared to other locations on Bear Creek or on nearby sections of the North Fork Salt River. In addition, no riffle fish species were found in any of the Bear Creek sampling locations, while sampling on the North Fork yielded three such species. The low diversity near the plant when compared to the much higher diversity upstream, indicates noncompliance with state general criteria for protection of aquatic life. The results from this study are shown in Table 2.

Sampling Sites for 2001 Fish Study



Key for Sampling Sites

Sampling Site Descriptions

B1 – Bear Creek 1.5 miles upstream of Kirksville WWTP
B2 – Bear Creek 0.2 mile downstream of Kirksville WWTP
B3 – Bear Creek 9.5 miles downstream of Kirksville WWTP
B4 – Bear Creek 20 miles downstream of Kirksville WWTP

S1 – North Fork of Salt River 1.6 miles downstream of Queen City
S2 – North Fork of Salt River 4.5 miles downstream of Queen City
S3 – North Fork of Salt River 10.7 miles downstream of Queen City
S4 – North Fork of Salt River 20.4 miles downstream of Queen City

Table 2. Number of Species of Fish Collected in Two Streams in Adair County, Missouri, May 2001

Bear Cr. Site	No. of Species	N. Fk. Salt Site	No. of Species
B1	9	S1	1
B2	1	S2	9
B3	11	S3	12
B4	12	S4	17

Note: Sampling sites on N. Fk. Salt River were chosen so that they had about the same sized watershed above them as the corresponding site number on Bear Creek.

For more information call or write:

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